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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/068,384

02/07/2002

Minoru Sudo

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01/29/2004

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31ST FLOOR
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EXAMINER

NGUYEN, JIMMY H

ART UNIT

PAPER NUMBER

2673

DATE MAILED: 01/29/2004

5

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/068,384

Applicant(s)

SUDO, MINORU

Examiner

Jimmy H. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is made in response to applicant's pre-amendment filed on 01/21/2003 (entered into the file wrapper as Paper No. 4). Claims 1-23 are currently pending in the application. An action follows below:

Priority

2. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in 10/068,384 on 02/07/2002. It is noted, however, that applicant has not filed a certified copy of the JP 2001-032261 and JP 2002-020623 applications as required by 35 U.S.C. 119(b).

Claim Objections

3. Claims 1, 8, 9 and 10 are objected to under 37 CFR 1.75(a) because although these claims meet the requirement 112/2d, i.e., the metes and bounds are determinable, however, "LED", line 1 of these claims, should be changed to --light emitting diode (LED)--, so as to make this feature being definite.

It is in the best interest of the patent community that applicant, in his/her normal review and/or rewriting of the claims, to take into consideration these editorial situations and make changes as necessary.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 8 and 9 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the

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art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding to claims 8 and 9, the disclosure, when filed, does not contain sufficient information regarding to the claimed features, “a control circuit for **reducing** the boosted voltage when the constant current has the predetermined value”, as recited in claim 8, last 5 lines, and “means for **reducing the boosted voltage** when the constant current has the predetermined value”, as recited in claim 9, lines 3-6. The disclosure, page 14, lines 9-15, and page 17, lines 3-19, discloses that the boosting circuit 101 **stops boosting** at the optimum boosted voltage VDDU when the current has the predetermined value. It is noted applicant that “stopping the boosted voltage” and “reducing the boosted voltage” are different. Accordingly, the disclosure, when filed, does not contain sufficient information regarding to how to reduce the boosted voltage when the constant current has the predetermined value, so as to enable one skilled in the pertinent art to make and use the claimed invention.

6. It is noted Applicant that due to the rejection under 35 USC 112 above, the following art rejections are based as best understood by the examiner.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1 and 4-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Sameshima et al. (USPN: 5,061,861), hereinafter Sameshima.

As per claims 1, 4 and 5, the claimed invention is read on Sameshima as follows:
Sameshima discloses a LED drive circuit (11) (fig. 2, col. 3, line 54) comprising a constant current circuit (a circuit including elements 5c, 6b, 4c, 4b, 5b and 6a, and their connections, as shown in fig. 2, see col. 3, lines 53-57, col. 5, lines 1-3) for driving a plurality of LEDs (3) (fig. 2), a plurality of switches (9) (fig. 2, col. 2, lines 11-17), and a switch control circuit (a control circuit 10, see fig. 1, col. 2, lines 11-17). Further see col. 3, line 53 through col. 5, line 3. The elements in claims above are read in the reference.

Regarding to claims 6 and 7, Sameshima further teaches the constant current circuit having an external terminal for receiving a signal Vr1 in response to temperature for producing the constant current value for driving the LEDs (fig. 2, col. 5, line 64 through col. 6, line 19).

9. Claims 1 and 4-6 are rejected under 35 U.S.C. 102(e) as being anticipated by Nagumo (USPN: 6,400,349 B1).

As per claims 1, 4 and 5, the claimed invention is read on Nagumo as follows: Nagumo discloses a LED drive circuit (as shown in fig. 2) comprising a constant current circuit (a control voltage generating circuit 209, col. 8, lines 17-29) for driving a plurality of LEDs (LD1) (fig. 2, col. 7, lines 10-12), a plurality of switches (M2) (fig. 2, col. 8, lines 49-63), and a switch control circuit (a control circuit including elements LT1, 206, 207, TP1 and TN1, as shown in fig. 2). Further see col. 7, line 10 through col. 9, line 12. The elements in claims above are read in the reference.

Regarding to claim 6, Nagumo further teaches the constant current circuit having an external terminal for receiving a signal V_{REF} for setting the constant current value for driving the LEDs (fig. 2).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sameshima as applied to claim 1 above.

As per claim 3, Sameshima, as discussed in the rejection to claim 1 above, discloses all the claimed limitations except that Sameshima does not disclose expressly the constant current value in the range of about 5 to 30 mA. However, Official Notice is taken that, for most types of LED, the light efficiency, often expressed in the form of luminous intensity at 20 mA, is well known and expected in the art. It would have been obvious to drive the Sameshima LED with a constant current value of 20 mA because this would provide a steady light efficiency of the LED while using a low power consumption, as recognized by one of ordinary skill in the art.

12. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagumo as applied to claim 1 above.

As per claim 3, Nagumo, as discussed in the rejection to claim 1 above, discloses all the claimed limitations except that Nagumo does not disclose expressly the constant current value in the range of about 5 to 30 mA. However, Official Notice is taken that, for most types of LED,

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the light efficiency, often expressed in the form of luminous intensity at 20 mA, is well known and expected in the art. It would have been obvious to drive the Sameshima LED with a constant current value of 20 mA because this would provide a steady light efficiency of the LED while using a low power consumption, as recognized by one of ordinary skill in the art.

13. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sameshima, and further in view of Cato (USPN: 6,466,188 B1).

As per claims 8 and 9, Sameshima discloses a LED drive circuit (11) (fig. 2, col. 3, line 54) comprising a constant current circuit (a circuit including elements 5c, 6b, 4c, 4b, 5b and 6a, and their connections, as shown in fig. 2, see col. 3, lines 53-57, col. 5, lines 1-3) for driving a plurality of LEDs (3) (fig. 2), and a plurality of switches (9) for periodically turning on and off the LEDs (fig. 2, col. 2, lines 11-17). Accordingly, Sameshima discloses all the claimed limitations except for a boosting circuit and a control circuit for controlling the boosting circuit (claim 8) or means for increasing and reducing the boosted voltage (claim 9), as claimed.

However, Cato discloses a related LED driver circuit (as shown in fig. 4) comprising a boosting circuit (a voltage boosting circuit 120, col. 4, line 11) for boosting a power source voltage (V_{in}) and outputting a boosted voltage (an output of the boosting circuit 120), and a control circuit (a current sensing circuitry 430, col. 4, line 13), for controlling the boosting circuit, as claimed (see col. 4, line 6 through col. 5, line 16). It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to provide a boosting circuit and a boosting control circuit in the LED driver circuit of Sameshima, in view of the teaching in the Cato reference, because this would ensure a constant luminosity across the LED array for any given current flow, as taught by Cato (col. 1, lines 56-67).

14. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagumo, and further in view of Cato.

As per claims 8 and 9, Nagumo discloses a LED drive circuit (as shown in fig. 2) comprising a constant current circuit (a control voltage generating circuit 209, col. 8, lines 17-29) for driving a plurality of LEDs (LD1) (fig. 2, col. 7, lines 10-12), a plurality of switches (M2) for periodically turning on and off the LEDs (fig. 2, col. 8, lines 49-63). Accordingly, Nagumo discloses all the claimed limitations except for a boosting circuit and a control circuit for controlling the boosting circuit (claim 8) or means for increasing and reducing the boosted voltage (claim 9), as claimed.

However, Cato discloses a related LED driver circuit (as shown in fig. 4) comprising a boosting circuit (a voltage boosting circuit 120, col. 4, line 11) for boosting a power source voltage (V_{in}) and outputting a boosted voltage (an output of the boosting circuit 120), and a control circuit (a current sensing circuitry 430, col. 4, line 13), for controlling the boosting circuit, as claimed (see col. 4, line 6 through col. 5, line 16). It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to provide a boosting circuit and a boosting control circuit in the LED driver circuit of Nagumo, in view of the teaching in the Cato reference, because this would ensure a constant luminosity across the LED array for any given current flow, as taught by Cato (col. 1, lines 56-67).

15. Claims 1-7, 10-16 and 18-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshino et al. (USPN: 6,628,252 B2), hereinafter Hoshino, and further in view of Sameshima.

As per claims 1, 2, 4, 5, 10-12, 14, 18 and 20, the claimed invention is read on Hoshino as follows: Hoshino discloses a LED driver circuit (as shown in fig. 5) comprising a plurality of LEDs (15), and a constant current circuit (a circuit including elements 41, 42, 43 and Rs, see fig. 5). As noting at col. 5, line 46 through col. 6, line 16, Hoshino further teaches the LEDs (15) blinking or turning on and off at a frequency in the range from 100 KHz to 700 Kz, i.e., at a rate higher than a visual perception rate. Accordingly, Hoshino discloses all the claimed limitations of the above claims, except that Hoshino fails to teach a plurality of switches and a switch control circuit, as recited in claims above.

However, Sameshima discloses a LED drive circuit (11) (fig. 2, col. 3, line 54) comprising a plurality of switches (9) (fig. 2, col. 2, lines 11-17), each connected between a constant current circuit (a circuit including elements 5c, 6b, 4c, 4b, 5b and 6a, and their connections, as shown in fig. 2, see col. 3, lines 53-57, col. 5, lines 1-3), and a LED (3), and a switch control circuit (a control circuit 10, see fig. 1, col. 2, lines 11-17) for selectively turning on and off the LEDs. It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to provide a plurality of switches and a switch control circuit in the Hoshino LED driver circuit, in view of the teaching in the Sameshimo reference, because this would allow a desired LED to be selectively energized to emit light, as taught by Sameshino (col. 2, lines 14-17). Therefore, it would have been obvious to combine Sameshino with Hoshino to obtain the invention defined in claims above.

Regarding to claims 3, 13 and 19, the combination of Hoshino and Sameshimo, as discussed in the rejection above, discloses all the claimed limitations except that Hoshino and Sameshimo do not disclose expressly the constant current value in the range of about 5 to 30

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mA. However, Official Notice is taken that, for most types of LED, the light efficiency, often expressed in the form of luminous intensity at 20 mA, is well known and expected in the art. It would have been obvious to drive the Hoshino LED with a constant current value of 20 mA because this would provide a steady light efficiency of the LED while using a low power consumption, as recognized by one of ordinary skill in the art.

Regarding to claims 6, 7, 15, 16, 21 and 22, as noting in fig. 5 and at col. 2, lines 49-54, col. 5, lines 19-42, Hoshino further teaches the constant current circuit having an external terminal for receiving a control signal (CONT) from a controller or a microcomputer, for setting the constant current value, which varies in accordance with temperature.

16. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshino, and further in view of Cato.

As per claims 8 and 9, Hoshino discloses a LED driver circuit (as shown in fig. 5) comprising a boosting circuit for boosting a power source voltage (V_s) and outputting a boosted voltage at a terminal 4a (col. 8, lines 9-18), a plurality of LEDs (15), and a constant current circuit (a circuit including elements 41, 42, 43 and R_s , see fig. 5), and. As noting at col. 5, line 46 through col. 6, line 16, and at col. 8, lines 19-30, Hoshino further teaches means for periodically turning on and off LEDs at a frequency in the range from 100 KHz to 700 Kz. Accordingly, Hoshino discloses all the claimed limitations of the above claims, except that Hoshino fails to teach a control circuit for controlling the boosting circuit (claim 8), or means for increasing and reducing the boosted voltage (claim 9), as claimed.

However, Cato discloses a related LED driver circuit (as shown in fig. 4) comprising a boosting circuit (a voltage boosting circuit 120, col. 4, line 11) for boosting a power source

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voltage (Vin) and outputting a boosted voltage (an output of the boosting circuit 120), and a control circuit (a current sensing circuitry 430, col. 4, line 13), for controlling the boosting circuit, as claimed (see col. 4, line 6 through col. 5, line 16). It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to provide a boosting control circuit in the LED driver circuit of Hoshino, in view of the teaching in the Cato reference, because this would ensure a constant luminosity across the LED array for any given current flow, as taught by Cato (col. 1, lines 56-67).

17. Claims 17 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshino in view of Sameshimo as respectively applied to claims 11 and 10 above, and further in view of Cato.

Regarding to claim 17, since the combination of claims 8 and 11 discloses all the claimed limitations of claim 17, claim 17 is therefore rejected for the same reasons as set forth in claims 8 and 11 above.

Regarding to claim 23, since the combination of claims 8 and 10 discloses all the claimed limitations of claim 23, claim 23 is therefore rejected for the same reasons as set forth in claims 8 and 10 above.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jimmy H. Nguyen whose telephone number is (703) 306-5422. The examiner can normally be reached on Monday - Thursday, 8:00 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached at (703) 305-4938.

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Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231


or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,
Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding
should be directed to the Technology Center 2600 Customer Service Office whose telephone
number is (703) 306-0377.

JHN
January 26, 2004



Jimmy H. Nguyen
Examiner
Art Unit: 2673